ING DRIVE OF WOOD FOR A N. E. PULP MILL. (Brown Company photo, courtesy of American Forest Products Industries, Inc.)

Ideas for New Business Firms

By CYRIL C. HERRMANN[1]

"I want to go into business for myself" is a familiar claim. Many people have voiced it, some have tried it, and a few have succeeded at it. Basic to the success of any new business is the choice of the idea.

Finding the idea is often a difficult problem. Even more difficult is the problem of evaluating the idea's suitability for a new firm. There does not seem to be any scientific or highly developed methodology to assist the entrepreneur in finding the idea best for him. Certain limiting factors, such as education, experience, availability of funds, and state of the industry set up a framework within which entrepreneurs examine ideas. Nevertheless the choice of the idea remains highly introspective and subject to circumstance. This article explores some of the problems involved in selecting ideas for new business firms.

THERE NEVER has been a shortage of ideas for new enterprises, but there always has been a shortage of *good* ideas. When several venture capital firms opened their doors shortly after the end of World War II, they received a deluge of ideas coming from all sorts of people and from all corners of the globe. One venture capital firm very quickly filled three filing cabinets and did not get a single idea it considered meritorious. Most of the proponents of the ideas had no concept of what a new firm required in terms of a product that would successfully support manufacturing operations.

Origins of New Ideas

New business ideas tend to come from identifiable origins, each capable of supplying both worthwhile and inconsequential ideas.

Past Experience. A very important source of ideas for new firms is the past experience of the entrepreneur in a given industry. A familiarity with current operations sometimes permits him to recognize new possibilities. A young physicist who worked at Los Alamos during the war, doing research on problems of atomic energy, noticed that a reoccurring need of the research laboratory was an accurate count of high-speed streams of electrical impulses. After the war he developed a commercial nuclear scaler that could handle the measurement problems of the atomic energy research laboratories. He correctly foresaw that the research laboratories would prefer to purchase a commercial scaler rather than build their own laboratory models. Although he did not know if a broad enough market existed, the physicist decided he had found the idea for a new business. The possibilities of severe competition appeared small because product development required a high degree of skill and understanding both in physics and electronics. His product resulted from experience in a new and expanding industry where highly skilled people were at a premium.

Unsatisfied Need. Another source of new enterprise ideas is the observation of an unsatisfied need. Such observation need not depend on prior experience in a given industry, although a certain frame of reference has to exist in order to recognize the need.

An engineer who worked for three different electronic control companies doing research, design engineering, and production engineering observed the growing use of compressed air in the companies buying electronic controls. He believed that existing compressed air regulator valves were far from having maximum performance characteristics. Although his experience was in electronic controls, the engineer left his job and spent almost a year doing research and development on a new type air regulator valve. His idea came from the observation of a need not properly satisfied.

New products developed in response to an observed market need usually involve significant amounts of research and development in order to meet the market requirements. Alert entrepreneurs frequently concentrate on development of a differentiated product that will satisfy an observed market because of the likelihood that such a new product will support a

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successful new business enterprise.

Invention. Some entrepreneurs invent the new products that become the basis of new firms. However, individuals with a desire to start new businesses often place too much emphasis on the necessity of inventing a new idea in order to get started. Usually one man does not combine the qualities of the successful inventor and the successful entrepreneur. Inventors and entrepreneurs are two quite different types of individuals and the chances of one man having the qualities of both types is small, and not frequent in actual practice. The entrepreneur is at his best when he is able to devise a highly differentiated new product with new performance characteristics that meets a market need, or when he takes over an idea from an inventor and develops it in the market.

Market Request. Other new enterprise ideas come from market request. Even though the entrepreneur may not himself observe an unsatisfied need, the market may request him to develop a new product to fulfill a need.

A case in point is that of a practicing lawyer who specialized in marine insurance claims. He was acquainted with a number of people in the shipping industry through his law practice, and in 1942 he learned that ships on the Murmansk run wanted an improved method of carrying drinking water used in stocking lifeboats. The captain of a fleet of merchant tankers asked him to try canning fresh drinking water. The lawyer did not know that canning companies considered it impossible to preserve fresh drinking water in tin cans, and he tried it only because the market requested him to get into this business. This idea later became the basis of a successful new firm.

New firms typically do not get their initial product idea as a result of market request, but in a majority of cases the expansion of the product line originates from this source of new product ideas.

Technological Progress. Perhaps one of the most significant developments for the prospective entrepreneur to watch is the increasing amount of technical research going on in academic and industrial laboratories since the end of World War II. Some of these developments are producing ideas which clearly are capable of supporting useful new products to supply existing market needs. In other cases, the end result of the research is a discovery which has no immediately practical use, at least insofar as the technical researcher himself knows.

The electronics industry furnishes an example of technological progress as a source of new product ideas. Resulting largely from Bell Laboratories research, the germanium transistor improves upon the vacuum tube and opens unknown numbers of new industrial opportunities, for the transistor has certain performance characteristics that surpass those of the vacuum tube. No one can forecast just what new products may result from this technological progress.

Accidental Discovery. Some individuals literally "stumble" over the idea in the course of other activities, and it is only through a later evaluation of the idea that the individual decides to exploit the accidental discovery. In the total range of new idea sources, accidental discovery does not occur frequently.

A marine engineer took home defective springs used in suspending instruments while testing new ships. He accidentally dropped a spring at the top of the stairs and noticed his children enjoyed watching the spring "walk down the stairs." He decided the spring would make an appealing child's toy and started a new company based on that idea.

Hobbies. In a few cases, hobbies supply the initial impetus for going into business. However, they are not an important idea source and frequently lack the necessary qualifications to support a new business.

A man with a hobby of optics and microscopic work started a company doing research in blood. After five years he decided the opportunities were too limited to justify further development of the company, and in addition his interests shifted to mechanical engineering. But it was a hobby that had succeeded in leading him into the field of entrepreneurship.

Many individuals with entrepreneurial qualities overlook or minimize the most bountiful source of new ideas — other persons who have generated new product ideas and seek some method of seeing those ideas established in the market. People with new product ideas frequently recognize their inability to go any further for a variety of causes, such as lack of understanding of business activities, primary responsibility in another line of endeavor, lack of financial strength, or reluctance to assume risks. In such cases there is a logical connection between the entrepreneur and the person who generated the idea.

New Ideas from Others: Personal Contacts. New ideas obtained from others tend to result either from personal contacts or from methodical search. Usually entrepreneurs who are interested in starting a new firm are constantly on the lookout for personal acquaintances who can supply the idea. In this situation, usually the suggestion for the establishment of a new business comes from the entrepreneur rather than the personal contact who has the idea.

A Harvard scientist who feared the restrictions of a large organization hoped to establish a new company based on several important new products. He wanted to use the revenue from these products to support further scientific research. Without a product in mind, he became acquainted with a doctoral candidate who was working on a wide band distributive amplifier. Each man believed the wide band amplifier possessed attractive industrial possibilities. The Ph.D. candidate was not interested in getting into business and licensed the use of his development work in return for a 3 per cent royalty on sales for the first three years of operations.

New Ideas from Others: Methodical Search. The most overlooked source of new product ideas in the entire new enterprise field is that of methodical search. In such instances the entrepreneur doesn't generate a new idea of his own, nor does he discover an idea through personal contacts. An entrepreneur who uses the methodical search method of finding an idea applies the same logical technique he would use in setting up the production operation. He deliberately makes contact with all the potential sources of the kind of idea which he is seeking.

One experienced executive starting a new company asked all his business acquaintances to inform him of

interesting new ideas. He also called upon patent attorneys, inventors, industrial research departments, corporation lawyers, investment bankers, and venture capital firms. For three months, he devoted one day a week to a methodical search. The executive then selected a new-type automotive part which became the basis of a successful new firm. His reputation for being receptive to new ideas soon resulted in broadening the line with several additional meritorious new products.

An accompanying table lists twenty-two sources of new business ideas that may aid prospective entrepreneurs in discovering profitable new product opportunities. Although the list is far from exhaustive, it provides a number of alternatives to evaluate and choose from. In actual practice, there seems to be very little done in the way of conducting a methodical and painstaking search for ideas.

Selecting the Idea

Before choosing the idea, the entrepreneur faces a potentially broad range of alternatives; but after making the final decision, his future actions are limited. Making the best choice involves picking an idea that is sound economically as well as sound in terms of the personal capabilities of the entrepreneur.

Founders of new businesses seem to choose their new product idea pretty largely on an emotional basis. They "fall in love" with the idea and from that point on are strongly biased in its favor. As a group, the entrepreneurs seem to do very little comparing of the favorite idea against possibly better alternatives. While a high level of enthusiasm is needed to establish a new business, it appears somewhat dangerous to enthuse too highly over the choice of the idea, for the enthusiastic choice of a poor idea frequently leads a new firm to eventual failure.

For example, one man poured all of his savings into a new firm that was to make a differentiated waffle iron. The market snubbed it, and the entrepreneur lost all of his savings, having discovered meantime that there were several better waffle irons on the market. When he chose the idea he never considered its soundness; rather, he was so "sold" on the idea he just assumed it was good.

A new firm setting out to develop a new product faces many problems even when the basic idea behind the business is sound. In order to establish a successful new enterprise based on a good idea, an alert entrepreneur should consider carefully eleven basic criteria.

Limits and Goals. Starting a new business is a difficult task and an entrepreneur finds it wise to use his time and effort as economically as possible. The more precisely he knows what he is trying to accomplish, the more likely he is to achieve a plan of action that will succeed. Conversely, a new firm that suffers the temptation of going off on unrelated tangents frequently suffers the risk of failure. The narrowness or breadth of the goals depends entirely upon the capacity of the entrepreneur.

Entrepreneur Capabilities. Usually the entrepreneur who "trades down" his own abilities later wishes he had considered the problem more carefully before committing himself to the idea. An economist in the Harvard graduate school started a self-service laundry; and although it was successful, he soon sold it in order to start a new concern which was a much more challenging enterprise.

The man with specialized education and/or training is more likely to succeed in starting a business which draws upon this background. This is especially true in technical fields. The new firm faces less prospective competition by using this entrepreneurial asset.

Inventors who seek a market for their ideas.

Patent Attorneys representing inventors of new products.

Mechanical and Consulting Engineers who are working on projects in the idea or design stage and are looking for a business tie-in.

Scientists and Technicians who contribute toward technological progress but do not know how to exploit the results.

Salesmen operating in the industry of greatest interest to the entrepreneur. They observe market needs as well as new industrial developments.

Manufacturers' Agents who know of new developments and are looking for a sales tie-in.

Commercial Bankers who are acquainted with individuals having new ideas in need of financing.

Local Chambers of Commerce and Trade Associations who work on the development of their areas.

Industrial Development Commissions who seek to encourage the industrial growth of an area and are anxious to bring in new businesses with attractive growth potentials.

Venture Capital Organizations who may have secured meritorious ideas and are looking for the right entrepreneur to develop them, or who have meritorious ideas that are beyond the objectives of the financing group.

The United States Government in connection with the Point IV Program for the industrialization of underdeveloped areas abroad.

Public Utility and Railroad Companies that maintain development departments for building up business on their lines.

Foundries that work on new products in the experimental casting stage.

Pattern Makers and Model Shops in a position similar to foundries.

Chief Engineers of well-established firms who have developed new product ideas that were not carried out by the original firm.

Purchasing Agents who know of market needs not being satisfied.

Advertising Agencies that work on the merchandising programs of new products that must be farmed out for manufacture.

Court News telling of the death of an owner whose estate included assets that comprised a new product under development.

New Product News of newspapers, magazines, and trade journals.

Businessmen's Clubs and Professional Societies whose memberships offer profitable areas for increasing personal contacts.

Professional Patent Searchers who comb existing patent records for new product ideas awaiting further development. Sources include:
Manual of Patents; The Index of Patents; Official Gazette; Specifications and Drawings.
(The entrepreneur may conduct his own patent search in any well-stocked business library if he has the time and ability.)

Research Directors of well-established firms that have new product ideas the firm is not going to develop and is willing to surrender on some type of royalty basis.

Superior Products. A basic question to ask of any new product is: "What will make it sell?" If the product is only equivalent in value to products already established in the market, it faces an uphill fight. If the market is highly competitive, it probably faces failure. The new waffle iron had nothing special to commend it to the market. Consumers were satisfied with existing products which they knew and trusted, and the new product suffered in comparison. Superior performance assures a new product of consideration, although not necessarily a ready sale. Satisfying a market need in a superior manner is one of the strongest assets a new firm may achieve.

Expanding Demand. Usually products with an expanding demand are part of an expanding industry. For example, the rapid expansion of the electronics industry favors the development of new firms because many producers are busy meeting the demand. A new business has a chance to survive even if it is an inefficient producer during its early stages.

Identifiable Markets. New firms need economy of motion to husband their limited financial and managerial strength. The new products that get off to the best start are those that satisfy a known and identified market, and where the product is developed in response to a known need of that identified market.

For example, the lawyer who succeeded in preserving drinking water in tin cans knew where to pinpoint sales since he had accepted an order before starting the new firm. The captain of every ship was a potential customer, and might purchase water for an entire fleet.

It is a mistake for entrepreneurs to put all of their energies into developing a new product without knowing what market the product will face after it is produced. Investments in tooling, machines, materials, and buildings sometimes are lost because market appraisals are postponed until production is established.

New Firm Potential. In considering the new product idea, the entrepreneur has to relate it to his own potential ability to launch a new firm. Frequently new products involve difficult and unforeseen production problems that hinder attaining a finished product. Serious delays in product development tend to consume the original financing and some new firms fail before the product ever gets to the market.

In some instances a new firm relies on subcontractors for all or part of the production work. This doesn't solve problems of getting a workable product of acceptable quality, and subcontractors sometimes tend to intensify problems of delivery dates and reasonable production costs.

Finally, the new product has to reach its market. In some cases the new firm experiments with several different distribution methods at the expense of poor sales and dwindling finances. The first sales income returning to the new firm relieves it of the necessity of living off capital. Consequently a poor choice of distribution channels needlessly lengthens the amount of time the firm consumes its capital. Typically, direct sales are too expensive for the new firm, and high quality middlemen are hard to secure because they are engaged in representing lines which have already been established for a long time in the market.

Development Periods. While it is an advantage for the new product to offer unique advantages to the user, and while that product might have been in the development stage for many years prior to coming to the entrepreneur's attention, when he selects the idea as the basis for his new firm, the end of the development work should be in view. The less well developed the idea, the greater the risk assumed in selecting it.

Newness and Familiarity. The new product that is too highly familiar in its performance and appearance has very little to commend it to the user. He is content to go along satisfying his market needs with tried and known products. At the other extreme, new products that are so unfamiliar as to strike the user as "radical" face a high degree of skepticism and market resistance. The entrepreneur has to walk a tightrope in arriving at a decision as to the proper balance.

A new and distinctive product that corrects a recognized dissatisfaction of the user has a real market advantage. If it has, in addition, a familar overlapping of characteristics similar to existing products, its chances of successful adoption in the market are probably even better.

Some entrepreneurs with highly differentiated new products that might be called "radical" hold back on the original product and gradually differentiate the product more and more with a succession of new models. This policy not only assures a better market acceptance, but also gives continued market strength to the product over a period of time.

Product Imitation. Perhaps the most discouraged entrepreneurs are those whose new ideas are quickly imitated. It is not unusual for entrepreneurs to spend thousands of dollars and several years of time developing a new product. After getting into the market and winning a favorable response, several competitors in similar fields pick up the new product, duplicate and improve it slightly, lower the price, promote it, and reap the large volume rewards the entrepreneur originally hoped for.

One entrepreneur who had such an experience decided that he had overlooked several vulnerable points of his new firm. First, his idea had no protection either of patents or secret processes or highly specialized ability. Second, being a consumer item with a mass appeal, it attracted mass production companies because of the volume potential. Third, a low price and heavy promotion were important methods of getting customers. The large firms were able to drop the price and advertise, taking a "red-ink" period of loss on the product while waiting for the demand to materialize. The entrepreneur sadly concluded his new product was ideal for a large firm, but not for a new one.

In direct contrast was a new firm that brought out a nuclear instrument used for inspection and quality control in industry. The instrument had a very broad application, and several large industrial concerns spent several years trying to duplicate the product. They did not succeed because the engineers in the new firm had more "know-how" and experience in this highly technical field than any of their potential competitors. With a well-established lead in the market and with a reputation already won, the new firm was on firm ground and no longer feared potential competition.

While basic patent protection is infrequent, most

new products enjoy some kind of "fringe" patents at least. As a rule, entrepreneurs do not place much value on such patents, but feel they are an added protection from competition in early stages. Another device is to keep patents pending in order to frighten off potential competitors who have no way of knowing how important the application might be, since pending patents are not a matter of public record.

A consideration of the length of life of a new product in the market is important. The new firm that offers the market a novelty or gadget of some kind either has to come up with another new product in a short time or get ready to liquidate. When the users quickly tire of a new product, the new firm faces a crisis.

At the other extreme is the problem of a product with an indefinite life span. On such a product repeat sales are rare, and a new firm will falter as soon as it satisfies the initial demand.

One entrepreneur was considering a new firm to produce and sell nautical compasses. Upon investigation he learned that many compasses had a length of life of fifty years and that it was unusual to replace a compass in less than fifteen years. Furthermore, the total market for compasses was rather limited. He decided to look further for a new idea.

A high rate of obsolescence is another problem of new firms bringing out new products. In a rapidly expanding industry enjoying considerable amounts of technological progress there is always the danger that competitors will not just duplicate the product, but bring out a better one. Many entrepreneurs take the point of view that "we want to be the first to make our own product obsolete." The strength of many new firms frequently is their flexibility and ability to take rapid action, especially on technical problems involving their products. New firms often seem to contribute toward technological progress by challenging products of established firms in the marketplace.

Specification Sales. A new product that answers a market need, does it according to specifications, and proves itself in performance seems to have the best market characteristics for a new firm. Such a product tends to sell itself. However, a product that is very little different or better than existing products cannot sell itself. In order to facilitate sales, such a new firm has two alternatives: heavy promotion to break down market resistance, or sale at a lower price than similar existing products.

If the new product is planned to sell at a lower price than existing products, it is in a vulnerable position because competitors are likely to lower prices to the same level. The momentum of the going concern gives it an advantage in weathering price competition until the new firm exhausts its resources and goes bankrupt. Certain entrepreneurs who do not correctly calculate costs actually slowly liquidate the new firm while selling on a cut-price basis.

Most new firms engage in limited advertising in order to inform the market of the availability of the new product and to specify in detail what the new product can accomplish. They cannot afford advertising battles with well-established companies. As one entrepreneur phrased the situation: "Do not pick a market you have to hit over the head with advertising in order to get a sale." He believed the new firm had very little chance of pushing existing products out of the market with advertising alone. Observable product superiority has to do the pushing.

Select a Product That Will Support a New Firm. One of the most difficult of all the problems the new firm faces is to choose a product that will support the company on a continuing basis and provide for future growth and expansion. Some new products may prove to be superior and win market acceptance and yet the combination of volume of units sold and the margin on each unit may not be enough to keep the firm alive.

The entrepreneur has to plan ahead when selecting the idea in order to arrive at any informed judgment. In effect, he tries to estimate the unit selling price, the number of units that will sell over a given period of time, the variable and fixed costs, the number of personnel and size of payroll, the amount of space and the cost of the lease, the number of machines and the amount of investment, the different raw materials and their prices and availability, the availability of financing and the cost of securing the financing — in short, the entrepreneur tries to predict ahead of time all the elements of a balanced business operation. While extreme degrees of accuracy are impossible, this advance planning is very important. Within certain ranges, the entrepreneur must learn what the new product has to do in order to support operations. It is also important for the entrepreneur to identify ahead of time the problems he will encounter in the future.

A Checklist for Selecting NEW BUSINESS IDEAS

Set limits and goals to guide policies of the new firm.
Capitalize on the capabilities, training, and interests of the entrepreneur.
Select a product that promises superior performance.
Select a product with an expanding demand.
Select a product that will satisfy a known need.
Select a product the new firm can finance, produce, and distribute.
Avoid products with long, expensive development periods.
Avoid extremes of product newness or familiarity.
Select a product which competitors will not quickly replace.
Choose a product for sale by specification rather than price or promotion.
Select a product that will support a new firm.

Conclusion

Perhaps the single most needed feature that is currently lacking among entrepreneurs is careful preliminary planning of the new enterprise. Certainly the new firms observed in this study that failed might never have started in the first place, or they might have surmounted their problems to succeed, had this preliminary planning taken place. The new firms that succeeded might all have prospered more and utilized original financing to a greater advantage had better preliminary planning preceded the actual organization of the firm. An essential element of this advance planning is a knowledge of the sources of new ideas and the careful selection of the best idea for the new firm.

Monthly Review
FEDERAL RESERVE BANK OF BOSTON

Committee Reports to Governor on FOREST POLICY FOR NEW HAMPSHIRE

New Hampshire has a forestry problem. It has in fact had one for half a century or more as professional foresters and conservationists have pointed out. The general situation has, however, somewhat resembled that of a man in the early stages of a cold who hopes it will not develop into anything serious. Now, in the early nineteen-fifties, the symptoms are unmistakable and the time has arrived for treatment. How sick is the patient and what is the correct treatment?

The diagnosis and prescription were worked out during the latter half of 1952 by a committee appointed by Sherman Adams, at that time Governor of New Hampshire. Under the title "Forest Policy for New Hampshire," the committee's report analyzes the state's forestry problem and proposes an action program for the next five years directed towards its solution.

Because New Hampshire's forestry situation is quite typical of New England's situation the committee's findings and recommendations are of general interest throughout the six-state area. This article presents the committee's report in condensed form.

The Diagnosis — *The Forest Situation in New Hampshire*

Forests are basic in New Hampshire's economy, directly or indirectly supporting at least one-fourth of the gainfully employed persons in the state. The state contains some 4.7 million acres of commercial forest land — 84 per cent of the total land area. This area provides the raw-material base for numerous timber-using industries. Employment in the woods and in these timber-based industries accounts directly for nearly 10 per cent of New Hampshire's total labor force. Assuming that there is one worker in the service and transportation industries for every worker engaged in primary manufacture or production, about 20 per cent of the state's gainfully employed can trace their jobs directly or indirectly to wood production. If, furthermore, as seems reasonable, the recreation industry owes its existence, in large measure, to the existence of New Hampshire's woodlands, well over one-fourth of all workers in the state derive their incomes directly or indirectly from New Hampshire's forest resources.

The long-run outlook is for increasing demand for all of the products of the forest. Future markets and good prices seem assured for any quantity of high-quality timber New Hampshire can produce. New uses and demands are developing for many of the lower-grade products. Population is increasing and the recreation business is expanding. Greater demand for water for industrial use, the dependence of game and commercial fish on reliable streamflow, and the need for minimizing damage from floods make the watershed protection afforded by forest cover of immense importance.

Foresters generally agree that timber production in New Hampshire could gradually be increased and eventually maintained at more than double the present level. It is believed that really good forest management could boost the yield to three times the amount now being taken out in an average year.

Despite their importance, most of New Hampshire's forests are in poor condition. Merchantable stands of sawtimber (more than 5,000 board feet per acre) are found on only 12 per cent of the forest area and much of the timber is of poor quality or inaccessible. Both the volume and quality of most of the standing timber are below requirements for maintaining current production rates. Although total growth measured in cubic feet, exceeds the annual cut, much of the growth is of poor quality hardwood or is located in inaccessible areas. Commercially desirable species and merchantable sizes of timber are being cut much faster than they are being replaced. Nearly three-fourths of the timber cut is white pine sawtimber, and the annual cut of this species exceeds growth by about 34 per cent. Unless the area of forest land under management for continuous crops increases rapidly, a lower level of lumber production at increased costs will result.

Not only is good quality sawtimber being overcut, but most cutting is done with little thought for future forest values. As a result, the condition of New Hampshire forests is steadily deteriorating. In 1951 only 19 per cent of the cutting operations qualified for yield-tax abatement by following minimum cutting practice standards. A recent study disclosed that only 10 per cent of the timber is cut in a manner designed to *increase* forest productivity. Two-thirds was found to be "clear cutting" and "high grading" which inevitably result in stand deterioration.

Unless present trends are soon reversed, future forest production will not be sufficient even to maintain the present level of activity of the forest industries. Woodland areas will be making only a small fraction of their potential contribution to New Hampshire's welfare. This is the heart of the forest problem.

Better Timber Cutting Practices Needed

The key to increasing future forest production is better cutting practices. There is available a great deal of knowledge of tree growing that has not yet been put into practice. If future forest productivity is to be increased, this knowledge must be applied by thousands of individual forest owners. Seventy per cent of the forest area, including much of the most accessible and potentially most productive land, is held in small private ownerships. How to interest the owners of these small properties in long-range forest management is a baffling problem.

In addition to better cutting methods when merchantable timber is being harvested, weedings, thinnings, and improvement cuttings are essential to the raising of forest productivity to needed levels. If such treatment costs something, or brings no immediate financial return, it seldom seems economically desirable

to the owners even though it may promise substantial future benefits.

Making more complete use of the wood and timber still available in the forests will help to increase the supply and conserve the resource. This depends on technology and economics. Changes in wood utilization must wait on decisions by the 700 individual wood-using industries now established. New and more efficient processes and better integration of wood uses are essential. The industries cannot be expected to utilize more low-grade hardwoods or make other changes in their wood consumption unless such steps are profitable.

Under even the best of circumstances *there will be no solution of the forest problem without considerable investment by forest owners, industries, and the public.* It will be impossible to adopt really good management without some investment in deferred production and in such methods of cultivation as weeding, thinning, pruning, and improvement cutting. New uses depend upon investment in plants and machinery. Better protection and access roads require cash outlays. The forest problem cannot be solved without costs, but the long-run benefits will repay such investment many times over.

Any permanent solution of the forest problem will depend on a gradual reorientation of the whole forest economy. *There must be a transition from "mining" timber as it "happens" to growing it as a crop that is planned and managed.* Such a transition must be accompanied by adjustments in ownership, industries, markets, credit facilities, risk factors and other influences. Forest policy should aid in these adjustments.

The Prescription — *A Recommended Program*

Research, education, encouragement, and control are four broad avenues of approach that forest policy can take. The primary aim should be to guide and assist forest owners and industries in making the transition to producing and utilizing managed forest crops.

Research is Fundamental

The purpose of research is to discover new and better techniques of management and utilization. The principal task of forest research is to find out what is biologically, technically, and economically feasible in forest management and utilization. Eight federal and two state agencies, the industries, private educational institutions, and some individuals provided funds estimated at more than $150,000 to finance forest research in New Hampshire in 1951. At present the research program includes long-term studies of timber management, growth and yield of natural and planted timber stands, seed sources, the effects of weeding, thinning, and pruning, and methods of insect and disease control. Much experimentation is also in progress on more efficient logging methods and on the manufacture and use of products. Flood control and water management are also being studied.

The committee recommends that forest research in New Hampshire be stepped up and aimed primarily at finding information that has direct application by forest owners and industries. Particular emphasis should be placed on applied research in the fields of silviculture, utilization and economics. Concentrated efforts should be applied to determination of growth rates under varying conditions of soil, site, species mixture, density, and cutting practice. More information is needed on costs of and returns from forest management of various forms and intensities on various kinds and sizes of ownerships.

Other high priority research projects are studies of economical methods of utilizing low-grade hardwoods and wood "waste," of labor-saving methods and machinery, and better integration in the harvesting and using of forest products. Studies of forest taxation should be undertaken — also studies of land classification, land use, the marketing of forest products, protection from insects, disease, and fire, forest genetics, water management and flood control.

Funds and facilities should be made available for an accelerated long-range forest research program in which the State Forestry and Recreation Commission, the University of New Hampshire, industry, and other private agencies should participate. Full use should be made of the federal agencies active in forestry research. Emphasis should be placed on the fullest integration and coordination of the over-all research activity.

Education and Extension Essential

The committee recommends that the educational approach to the forest problem be exploited as fully as possible. The vigorous forest education and technical assistance programs already underway in New Hampshire are strong evidence of the importance of this approach. The extension and county forestry program and the educational activities of the Society for the Protection of New Hampshire Forests, the University of New Hampshire, the schools, and others make this state outstanding in the field of forest education.

The foundation of a sound forestry program must be intensive education of all woodland owners so that they are aware of the opportunities in forest management and know how to take advantage of these opportunities. To make this program more effective, the committee recommends that:

1) The present county forestry program of education and assistance to forest owners be continued.

2) The county foresters continue to be the medium through which public agencies having forestry programs contact individual forest owners.

3) Persons receiving public assistance in improving their forest practices should agree to continue carrying out these practices.

4) Public foresters should recognize the legitimate field of private consulting foresters.

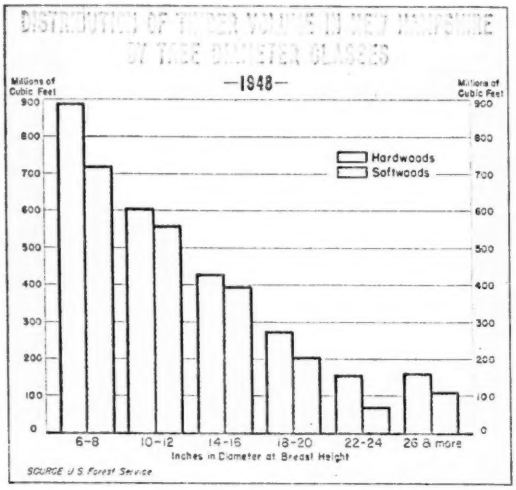
5) The county forestry program should be expanded only when there is a clear demand from landowners for additional technical help.

6) Forest industries should be urged to make a greater contribution to forest-owner education and technical assistance in the state.

7) The University of New Hampshire or the state's forestry department should employ a specialist in forest products marketing and wood utilization.

There is need for education of the general citizenry to widen understanding of the importance of forestry in the state. Top-notch professional forestry training should be readily available for students desiring it. The Society for the Protection of New Hampshire Forests

Most of New Hampshire's Timber is in Small Trees . . .



and the New Hampshire Natural Resources Council should intensify their efforts in the field of general forestry and conservation education and publicity.

Creating Conditions Favorable to Forest Management

The committee believes that creating favorable conditions for a transition to more intensive forest management is a necessary and desirable approach to the forest problem. While this approach should be fully exploited, it should not involve undue expense to other groups or unreasonable subsidy for forest owners and industries.

The Forest Conservation and Taxation Act of 1949 makes *taxation* one of the most important cornerstones of New Hampshire's forest policy. Although this is not a perfect law yet, the committee believes it is basically sound and recommends, for the present, only minor modifications in the law and its administration.

Land best used for producing timber should be classified as forest land on which bare land values should generally be kept within limits of $1.00 to $5.00 per acre. Although favorable acceptance of the yield tax principle by local officials is the general rule, some still need convincing that they ought not to defeat its purposes by appraising bare land values exorbitantly.

After the yield tax law has become more firmly established, consideration should be given to increasing the abatement for good forestry practices and to changing the formula under which towns are reimbursed for losses of tax revenue. The committee believes that opportunities exist for improving some of the details of the administration of the act at the state level.

Although credit and insurance are available to some extent to New Hampshire timber owners and processors, the signs point to a growth in the demand for new types of credit better adapted to the long-term needs of forest management. Broader insurance coverages and lower insurance premium rates would favor a greater demand for this type of investment protection. As interest in forest management grows, recognition of the need for insurance widens. Improved insurance coverage would stimulate the growth of interest in forest management.

A conference should be called to consider the problems and needs of forest fire insurance in New Hampshire. Representatives of the insurance companies, the banks, the forest owners, the forestry profession, and the public forestry services could work together to establish a forest fire insurance program in the state. Consideration of insurance against other causes of loss will eventually be desirable.

The time has not yet come for a fully developed forest credit system but signs indicate that it is on the way. Current attention to the implications of this impending development will be appropriate. The problem will be to meet the credit needs of owners undertaking the growing of forest crops as a business and of assisting the flow of capital investment into forestry in compliance with the principles of prudence.

The committee recommends that provision be made for keeping lending institutions informed of the opportunities developing in the field of forest credit. To this end a New Hampshire forest credit committee should be established consisting of bankers and representatives of the timber owners and processors. *Timberlands being managed for continuous forest production should be relieved of the limitations imposed by existing interpretations of Section 24 of the Federal Reserve Act under which loans on real estate must be confined to "improved" properties.*

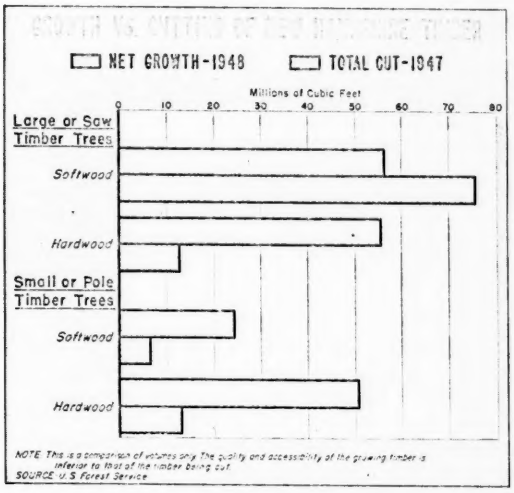
Adequate protection from *fire, insects, and diseases* is a basic requirement of conditions favorable to forest management. Although natural conditions and an efficient state forest fire protection system make the fire risk in New Hampshire's woodlands among the lowest in the nation, opportunities still exist for further strengthening of the forest fire protection program.

The general forest laws should be recodified. The specific forest fire laws should be amended and supplemented for greater future effectiveness. They should require that logging operations be amply equipped with fire-fighting equipment and should provide for state supervision of burning for blueberry production. They should encourage towns to enforce regulations concerning the use of fire in the open and provide relief to unorganized places from excessive costs of fire suppression.

The Forestry and Recreation Commission should receive additional funds to step up its "on the job" training program. The Forestry Department should increase the efficiency of the state forest fire protection organization by administrative action. It should take the lead in the formulation of cooperative forest fire prevention and control plans and programs.

To provide adequate protection from insects and diseases at minimum costs the committee recommends that the white pine blister rust control program be accelerated in areas well-suited to white pine production. The Division of Insect and Disease Suppression and Control should receive more funds to undertake a comprehensive program of insect and disease detection. Greater emphasis should be placed on the dissemination of information on forest pests and their control. A special forest pest fund should be established.

but the Cutting of Large Softwood Timber Exceeds Its Growth



The *forest industries*, to whom the future productivity of the state's forest resources is of direct concern, should develop forestry programs supplementing, stimulating, and encouraging existing public, private, and industrial programs. They should encourage more permanent types of timber-producing units. They should develop ways of financing timber access roads. The Planning and Development Commission should intensify the effort to bring in new industries that will utilize low-grade hardwoods.

Public acquisition of timberlands should not bring the total of public ownership above 22 per cent of the state's forested area. No more land should be added to the White Mountain National Forest except for consolidation purposes. By planned purchase and exchange, the 150,000 acres prospectively coming into state ownership should be combined into units large enough for economical administration. The committee recommends that a land acquisition fund be allocated to the Forestry Department. Town lands adaptable to forestry should be used for that purpose unless higher values can be otherwise realized.

Control of Cutting and Utilization Practices

Forest policy will be ineffective until there are changes in cutting and utilization practices in the woods and mills. After conditions have been made as favorable as possible for continuous profitable management and utilization of forest crops, there is still the problem of getting "on the ground" improvements in practices by owners and industries. There are two approaches to this final step in forest policy.

By the first step, each owner and industry is relied upon to act voluntarily in his own and the public's best interest once all the facts are known. By the second, the public or the permanent wood-using industries attempt to guarantee their own long-run welfare by requiring owners and industries to observe certain minimum standards in their operations. The committee explored both of these approaches. *It recommends primary reliance on voluntary control of cutting and utilization practices during the next five years supplemented, where feasible, with controls by industry over the practice of their raw material suppliers.*

The committee recognizes the possible eventual necessity of compulsory regulation in the event voluntary regulation of cutting practices fails to bring about substantial improvement in the level of cutting. Lack of agreement on the effectiveness of minimum forest practice standards, prospective difficulties of administration, distrust of the compulsory approach, and a belief that voluntary decisions will be best in the long run make such a radical departure from existing policy inadvisable at this time.

In regard to cutting practices the committee recommends immediate voluntary compliance by all forest owners with minimum forest practice standards. To support and expedite the adoption of such a program, state-owned forest lands should be so managed as to serve as demonstrations of good forest practices. Municipally owned forest lands and flood-control areas owned by the United States government should be managed in accordance with good forestry standards. Present cutting practices on the national forest should be continued. Forest industries should initiate management policies designed to bring immediately all cutting practices up to the standards specified for yield tax abatement, on their own lands and on lands on which they control the stumpage. Forest industries should channel their purchases so as to encourage good cutting practices. They should urge their suppliers to comply with the minimum forest practice standards.

Forest utilization constitutes the other fundamental aspect of the forest problem. Making more complete and efficient use of the timber that is available is as important as using the productive capacity of the forest more fully. The key to better utilization is technology profitably applied by hundreds of individual wood-using industries. Competing materials and consumer preferences are limiting factors. Although improved utilization can be attained in several ways, specific recommendations are difficult because of the diverse conditions each wood processor faces.

To improve the use of timber and wood in the state, a survey should be made of the tonnage of mill waste being generated at primary and secondary wood manufacturing plants. The state should establish and operate a clearing house for the widest possible dissemination of information relating to utilization, marketing, and harvesting of wood. Forest industries and other private interests should be encouraged to explore and exploit the advantages of more closely integrated operations, both in the mills and in the woods. Existing unintegrated practices are failing to realize greatest possible volume and value yields of forest products.

No program can ever be better than the people who take active part in its advancement. There must be provision for assurance that recruitment of woods and mill workers will bring in the people best adapted to the work. There must also be facilities for training to help them develop skills and a professional attitude toward work in the forest industries.

Monthly Review
FEDERAL RESERVE BANK OF BOSTON

Industrial Opportunities in New England:

DRUGS AND MEDICINES

The drug industry has unique opportunities for expansion in New England. Freight and power costs are of minor importance in site selection, and New England has the assets of fine quality water, advanced medical research facilities, and skilled labor.

New England drug firms are characteristically small in comparison with leading firms in the industry. Growth of present regional producers and establishment of branch plants by large nationally oriented firms would be a logical outgrowth of management re-appraisal of the region's advantages.

* * *

The United States drug industry has sales of more than $3 billion a year at retail prices. The rapid growth and product characteristics of this industry make it a logical candidate for a leading position among the future growth industries of New England.

Physicians' prescriptions in Latin script might as well be coded secrets for most people. For the manufacturers and distributors in the industry, however, they are messages which spell out a growing public demand. The demand is not only for products used in the treatment and the prevention of disease, but also for products to regulate bodily functions and relieve pain or discomfort.

Drug store patrons are used to finding a wide variety of items in their local store. Familiar items such as sickroom supplies and oral hygiene products occupy much of the display space. But at the drug counter the patron is confronted by a complex array of seemingly unrelated chemicals. He may buy a "proprietary drug" which is sold primarily for self-medication and is advertised by the manufacturer. Or he may buy an "ethical drug" which is usually sold on the written prescription of a physician. The proprietary portion of the drug industry has shown little growth in the last ten years. The ethical portion, however, has grown more rapidly than other parts of the chemical industry. This study deals primarily with ethical drugs.

There are six major categories of drug products, and their growth records show considerable variation. Antibiotics account for approximately 30 per cent of the drug industry sales. They are grouped separately because of their specific nature. Rightfully, perhaps, they should be grouped with the biologicals as they are products of biological origin, but the drug trade uses the term biologicals in a more restricted sense.

Prior to the advent of sulfonamides and antibiotics, the biologicals were of major importance. Now their value and volume are diminishing. Biologicals as a trade class include serums, vaccines and antitoxins. They still provide the only means of immunization against infectious diseases.

In the organic chemicals group are such well-known materials as alcohol, chloroform, glycerin and similar substances, as well as the newer synthetics like antihistamines, vitamins, sulfonamides, hormones and others. Organic chemical drugs have experienced a rapid increase in demand in recent years.

Among the hormones, ACTH and cortisone are leading products today. Many of these are made synthetically or are approaching that stage. Dried gland products have been practically eliminated from druggists' shelves. Digestive enzymes show possibilities of returning to a place of importance.

Some natural botanicals are still used in the form of tinctures or fluid extracts, but in a greater number of cases the active constituents have been synthesized, as, for example, caffeine. The class still continues to be used, and new products appear from time to time. Recent items which have been of interest are rutin and khellin extracts.

Inorganic chemicals include items such as boric acid, magnesium sulfate, and zinc oxide. They continue to be of importance in the proprietary field.

Manufacturing and Distribution

The drug industry produces primarily items with large profit margins, a factor of key importance in facilitating expansion. Annual reports of the more successful companies show actual profits before taxes of 20 to 30 per cent of total sales.

The industry aims at a markup of 4 to 6 times over the cost of the finished package in pricing its products for the retail level. After allowing discounts to trade, this markup provides adequate return to cover direct selling costs, advertising, administrative overhead and the 20 to 30 per cent of sales as pretax profit.

Approximately half of the dollar volume of both ethical and proprietary drugs moves to the consumer through drug wholesalers. The wholesale houses attempt to provide a complete line of drug merchandise and sundries to the retail druggist. Today with the increase in number of manufacturers, and items available, the wholesaler is playing a more important part than ever in distribution for the drug industry. Wholesalers provide warehouse facilities for drug manufacturers and fast delivery of the products to retailers. This permits the manufacturers to sell in large volume to the wholesalers, reducing the number of small orders from individual retailers. It also allows retailers to keep small inventories on a large variety of items.

Growth of the Drug Industry

Many factors have contributed to the increased use of pharmaceuticals. Research has revealed many valuable drugs and drug uses and people have become more health conscious. Growing membership in medical insurance plans has increased financial ability to purchase needed drugs. An increase in births, a growing population, and more aged persons have all been factors responsible for increased pharmaceutical sales.

Sales of ethical drugs have shown a greater growth rate than proprietary drugs over the past ten years. Prescription sales, which account for a large portion of the ethical drug business, showed a 268 per cent increase

in the 11 years from 1940 through 1950. In 1940, 188 million prescriptions were valued at $177 million. By 1950 prescription sales reached $618,791,000 and the number of new prescriptions filled reached 389 million. In 1940 there was an average of 1.43 prescriptions filled for every person in the United States. By 1950 the number had increased to 2.59 per person.

Specialty patent-protected products have become more and more important to the drug industry as competition has increased. Competition for the antibiotics market has increased immensely with increased production, increased uses, and decreasing prices.

Discovery of new substances in such fields as geriatrics, degenerative diseases, circulatory conditions, tuberculosis and cancer will have a significant effect upon the future of the drug business. The increase in longevity of the populace has created a large potential for drugs which will combat diseases and degenerative processes. Future products will tend to be preventive in character rather than therapeutic, as most of the infectious diseases have succumbed to the antibiotics and sulfonamides.

Location Aspects of the Drug Industry

There is some concentration of U. S. drug firms in the Philadelphia, Trenton, New York City area, but the total volume of production is not concentrated. Management representatives in the large companies have demonstrated considerable interest in diversifying plant locations. Keeping plant size down to 1,000 employees and spotting plants around the country strategically appears to be an effective method of keeping costs down. This policy indicates that New England locations should be attractive to the larger drug companies as they contemplate growth and diversification.

Although New England has a number of well-known and old, established drug firms, not one New England concern can be rated as a big firm in the drug industry. In 1951, sales of the largest New England drug company were less than ten per cent of the sales of the twelfth largest United States firm.

Utilities. Utility costs to the drug industry are of particular importance only to those companies that manufacture antibiotics. In the manufacture of other drug items, daily production is in terms of pounds rather than tons so that relatively small quantities of power, water, and fuel are required.

Water quality is important in all pharmaceutical products. In particular, an abundant supply of soft water is needed. New England's water supply is not only adequate, but its quality is such that in many cases it can be used in liquid preparations for internal use such as emulsions, syrups, and solutions, without any treatment. In addition to water for actual formulation, the manufacturers of antibiotics require large amounts of water for cooling purposes. Sea water has been found suitable for cooling purposes, and at least one large pharmaceutical plant in New England has drawn heavily from this source.

In antibiotic manufacture, waste disposal is an important expense factor. At the Charles Pfizer & Co., Inc. plant at Groton, Connecticut, it was found necessary to obtain waste land in order to dispose of the non-soluble wastes from antibiotic manufacture. Soluble wastes at this plant are piped into the ocean and have not been a problem. New England's coastal towns might well offer solutions to soluble waste disposal problems. Smaller towns in most instances also could provide waste land.

Labor. Prime requisites for the drug industry include a high proportion of scientific personnel, particularly in research and control and to a lesser extent in production. It is estimated that skilled labor makes up 10 per cent of the labor force in drug firms. Semi-skilled labor constitutes about 60 per cent of the labor force, and unskilled labor about 30 per cent. New England can provide all types of labor and scientific personnel that would be needed.

Materials. Assembly of materials is not a major cost to be minimized in selecting sites for drug manufacturing. Daily plant output is measured in pounds and the value of the incoming and outgoing shipments is high in relation to the transportation cost. Antibiotic manufacturing is a possible exception to this general situation in the industry. The exception arises out of the needs of antibiotic manufacturers for shipment of raw materials typical of the fermentation industries in which special freight rates could increase costs considerably, dependent on location.

Research. Research requirements are high in the drug industry. The major drug companies spend 3 to 6 per cent of the sales dollar for research. At times, particularly in small but growing companies, as much as 10 per cent of sales has been allotted to research.

Competition as well as rapidly changing techniques in therapy have resulted in an increasing demand for qualified researchers. Organic chemists, chemical engineers, pharmacologists, biochemists, microbiologists, pharmacists, physicians and clinicians are needed. Research has even extended to radioactive materials, creating a demand for physicists and men qualified in the technique of using such materials.

New England is one of the most concentrated areas of medical, clinical and other research activities in the United States. Massachusetts Institute of Technology, Harvard University, Boston University, Yale University, the Worcester Foundation, and hospitals such as Massachusetts General Hospital, Peter Bent Brigham, Joslin Clinic, and Lahey Clinic are all focal points for medical and pharmaceutical research. Many of the large pharmaceutical manufacturers invariably look to New England for clinical research work on new drugs they wish to check for Food and Drug Administration acceptance or therapeutic efficiency.

Several of the top colleges of pharmacy are to be found in New England. Massachusetts College of Pharmacy and University of Connecticut College of Pharmacy rank very high in this field, and other good colleges

This article is the ninth in a series of abstracts from the Arthur D. Little, Inc., study of Industrial Opportunities in New England. A reproduction of the complete study may be obtained for $2.00 on request to the Research and Statistics Department, Federal Reserve Bank of Boston, 30 Pearl Street, Boston 6, Massachusetts.

such as Rhode Island College of Pharmacy, New England College of Pharmacy and the Western Massachusetts College of Pharmacy, prepare an abundant supply of men trained in pharmacy and the allied sciences. In the veterinary field, probably the leading animal hospital in the world, the Angell Memorial Hospital, is located in Boston.

Many of the leading pharmaceutical researchers in the country have been trained in New England colleges and universities. Medical education is abundant. The failure of New England pharmaceutical companies to seek out these people and make use of this source of ideas is indeed surprising.

Management. One of the basic reasons for New England's failure to produce a leading drug company probably is in the basic conservatism inherent in the area. This reasoning is an outgrowth of interviews with executives of New England drug houses.

Growth rates of New England drug companies seem to point to top management as a cause for lack of expansion. Management is reluctant to make the expenditures of money necessary to expand their sales forces, and to intensify their advertising and research.

In view of this attitude within New England, it is ironical to find that the top men in many drug companies outside the region are in fact New Englanders. Perhaps the problem is to induce these men to return.

Conclusion

The manufacturing of drug products offers New England an opportunity to participate in a rapidly growing industry. On the one hand, the drug industry is not seriously handicapped by the need to import heavy low-value materials. On the other hand, it is favored by proximity to the region's advanced research facilities and skilled workers.

Large national firms seeking diversification of products and decentralization of production may look closely at the fine quality water available at many attractive sites in New England. The smaller drug firms of the region may well re-examine their positions in the light of new opportunities for expansion.

NEW ENGLAND'S NON-SECRET GOVERNMENT CONTRACTS

By Industry and Location of Manufacturer

(Amounts in Millions of Dollars)

COMMODITY GROUP	TOTAL, JUNE, 1950 — MARCH, 1953							QUARTERLY TOTALS APRIL, 1952 — MARCH, 1953			
	N. E.	Conn.	Mass.	Rhode Island	Maine	New Hamp.	Vermont	2d Qtr. 1952	3d Qtr. 1952	4th Qtr. 1952(a)	1st Qtr. 1953(a)
Food and Related Products	13.9	.3	10.4	.9	1.3	1.0	—	1.4	.5	.7	.6
Leather and Products	103.8	1.2	57.4	1.1	2.7	40.2	1.2	4.5	2.4	1.7	.6
Rubber and Manufactures	110.2	46.5	45.9	17.6	—	*	.2	21.7	8.3	4.4	3.2
Tobacco Manufactures	—	—	—	—	—	—	—	—	—	—	—
Textiles and Apparel	1,008.8	82.6	484.7	221.2	83.1	91.5	45.7	78.2	41.0	10.2	16.1
Cotton	(193.1)	(23.8)	(24.0)	(42.4)	(11.6)	(17.7)	(3.7)	(18.2)	(7.3)	(1.4)	(10.2)
Woolen and Worsted	(722.0)	(42.7)	(350.4)	(148.4)	(69.2)	(69.8)	(41.4)	(45.4)	(24.8)	(5.6)	(1.2)
All Other	(93.7)	(16.1)	(40.3)	(30.4)	(2.3)	(4.0)	(.6)	(14.6)	(8.9)	(3.2)	(4.7)
Wood and Manufactures	11.5	.9	8.1	.2	.8	.8	.7	.8	1.0	3.9	.7
Paper and Manufactures	56.9	8.1	28.6	2.8	11.3	5.0	1.1	4.8	4.0	1.2	2.5
Coal, Petroleum and Products	17.6	1.2	15.9	.4	.1	*	—	.1	3.6	.5	.2
Non-Metallic Mineral Products	7.6	3.4	2.4	.4	1.1	.3	—	.3	.3	.6	2.8
Metals & Mfrs. except Machinery and Vehicles	121.9	62.2	42.1	10.6	5.3	1.1	.6	11.0	13.1	6.6	9.1
Electrical Machinery and Apparatus	400.5	107.8	235.7	49.9	—	5.2	1.9	46.5	54.1	23.9	20.3
Machinery except Electrical	236.4	133.5	72.0	13.3	2.4	2.4	12.8	50.5	34.0	7.9	27.9
Transportation Equipment	933.6	751.4	111.2	2.4	65.6	.4	2.6	69.8	34.3	127.5	75.0
Motor Vehicles	(7.1)	(3.9)	(2.4)	(.8)	*	*	—	(.9)	(.3)	(.2)	*
Aircraft	(795.3)	(709.8)	(83.8)	(.4)	*	(.3)	(1.0)	(48.3)	(32.0)	(121.3)	(62.6)
Other	(131.1)	(37.7)	(25.0)	(1.2)	(65.6)	(.1)	(1.6)	(20.6)	(2.0)	(6.0)	(12.4)
Chemicals and Related Products	42.2	12.6	24.7	4.4	.1	.1	.3	4.4	1.3	3.2	6.1
Instruments	45.4	8.1	32.2	2.8	—	2.3	*	4.0	3.3	2.2	1.7
Ordnance	497.1	377.3	98.5	14.4	5.8	1.0	.1	79.5	79.8	103.6	66.6
Miscellaneous Commodities, n. e. c.	79.8	13.0	49.0	4.3	7.7	4.7	1.1	21.8	10.2	4.4	5.5
TOTAL	3,687.2	1,610.1	1,318.8	346.7	187.3	156.0	68.3	399.3	291.2	302.5(a)	238.9(a)

NEW ENGLAND BY SELECTED INDUSTRIES AND UNITED STATES TOTAL

Quarterly, July 1950 — March 1953

	1950		1951				1952				1953
	3d Qtr.	4th Qtr.	1st Qtr.	2d Qtr.	3d Qtr.	4th Qtr.	1st Qtr.	2d Qtr.	3d Qtr.	4th Qtr.	1st Qtr.
New England Totals	93.0	79.4	357.7	928.2	446.6	259.6	290.9	399.3	291.2	318.5(b)	232.1(b)
Textiles and Apparel	29.4	25.1	147.1	461.7	75.9	46.8	77.5	78.2	41.0	10.2(a)	16.1(a)
Transportation Equipment	14.3	6.0	29.5	233.3	166.0	81.0	96.9	69.8	34.3	127.5(a)	75.0(a)
Electrical Machinery	16.5	15.6	44.6	41.4	62.9	49.0	25.6	46.5	54.1	23.9(a)	20.3(a)
Ordnance	8.5	6.4	37.0	40.0	33.7	20.7	21.3	79.5	79.8	103.6(a)	66.6(a)
All Other Industries	24.3	26.3	99.5	151.8	108.1	62.1	69.6	125.3	82.0	53.3(a)	54.1(a)
United States Total	1,598.8	1,121.3	2,876.0	4,826.8	3,338.9	2,056.5	2,861.4	2,803.7	3,139.3	2,335.6(b)	2,855.5(b)
% New England of U. S.	5.8%	7.1%	12.4%	19.2%	13.4%	12.6%	10.2%	14.2%	9.3%	13.6%	8.1%

Note: Based on Department of Labor statistics showing non-secret Government contracts in excess of $10,000 for all contractors subject to the minimum wage provisions of the Walsh-Healey Act. Construction contracts are excluded. Publication of this data was discontinued effective March 31, 1953.

The contract information from this source is tabulated both by the state of the prime contractor and by the state of first listed supplier. On the latter basis, represented by the table, New England received 12.4 per cent of total U. S. contracts during the period June 1950–March 1953, as compared with 9.3 per cent based on state of prime contractor.

(a) Industry totals compiled by the Federal Reserve Bank of Boston from unadjusted weekly figures do not coincide with adjusted quarterly totals released by the Department of Labor.

(b) Quarterly summary by Department of Labor. No industry detail available.

*Less than $50,000.

Source: U. S. Department of Labor: Wage and Hour and Public Contracts Division.